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CLAIMS

1. A method for initiating communications over a channel between a transmitter and a receiver within a specified spectral range, subject to a mask to be applied at the transmitter so as to attenuate at least one segment of the spectral range, the method comprising:

providing to the receiver a definition of the at least one segment and of a level of attenuation to be applied within the at least one segment during a training interval of the communications;

transmitting a training signal from the transmitter to the receiver while applying to the training signal the level of attenuation within the at least one segment;

receiving the training signal at the receiver; and

compensating for a response of the channel based on the received signal and on the definition of the at least one segment and of the level of attenuation.

2. A method according to claim 1, wherein the communications comprise Asymmetric Digital Subscriber Line (ADSL) communications, and wherein the mask is applied to downstream ADSL signals, and wherein the at least one segment of the spectral range in which the downstream signals are attenuated is set aside for transmitting upstream signals.

3. A method according to claim 2, wherein the at least one segment comprises approximately the range of ADSL tones 32 through 63.

4. A method according to claim 2, wherein the level of attenuation applied within the at least one segment is in a range between approximately 10 dB and 17 dB.

5. A method according to claim 1, wherein providing the definition comprises communicating the definition from the transmitter to the receiver prior to transmitting the training signal.

6. A method according to claim 5, wherein communicating the definition comprises identifying first and second edge frequencies defining bounds of the at least one segment and conveying a level of the attenuation between the bounds.

7. A method according to claim 5, wherein communicating the definition comprises conveying an indication of power spectral density at each of a plurality of frequency points within the at least one segment.

8. A method according to claim 1, wherein providing the definition comprises determining the level of attenuation so as to enable reliable detection of the training signal by the receiver within the at least one segment of the spectral range.

9. A method according to claim 8, wherein determining the level of attenuation comprises setting the level so that the training signal substantially conforms to the mask.

10. A method according to claim 8, wherein determining the level of attenuation comprises setting the level so that the training signal has a higher amplitude within at least a portion of the at least one segment than is provided by the mask.

11. A method according to claim 10, and comprising increasing the level of attenuation after the response of the channel has been estimated, so that signals

transmitted thereafter by the transmitter do not exceed the amplitude within the at least one segment that is provided by the mask.

12. A method according to claim 1, wherein compensating for the response of the channel comprises correcting a value of the received signal based on the level of attenuation, and using the corrected value in compensating for the response.

13. A method according to claim 12, wherein correcting the value of the received signal comprises adjusting a level of the received signal at each of a set of carrier tones based on the level of attenuation at each of the carrier tones.

14. A method according to claim 12, wherein providing the definition comprises providing an indication of a power spectral density (PSD) function, and wherein correcting the value comprises dividing the value by a square root of a ratio between a value of the PSD function at a given carrier tone and a nominal PSD level.

15. A method according to claim 12, wherein using the corrected value comprises adaptively determining coefficients of a digital filter responsive to the corrected value.

16. Communication apparatus, comprising:

a transmitter, which is adapted to transmit communication signals over a channel within a specified spectral range while applying a mask to the signals so as to attenuate at least one segment of the spectral range, and which is further adapted, in a training interval prior to transmitting the communication signals, to

transmit a training signal subject to a predefined level of attenuation within the at least one segment; and

a receiver, which is coupled to receive the training signal and subsequently to receive the communication signals, and which is adapted to process the communication signals by compensating for a response of the channel based on the received training signal and on a definition provided to the receiver of the at least one segment and of the level of attenuation within the at least one segment.

17. Apparatus according to claim 16, wherein the communication signals comprise Asymmetric Digital Subscriber Line (ADSL) signals that are transmitted in a downstream direction, and wherein the at least one segment of the spectral range in which the signals are attenuated is set aside for upstream transmission.

18. Apparatus according to claim 17, wherein the at least one segment comprises approximately the range of ADSL tones 32 through 63.

19. Apparatus according to claim 17, wherein the level of attenuation within the at least one segment is in a range between approximately 10 and 17 dB.

20. Apparatus according to claim 16, wherein the transmitter is adapted to communicate the definition to the receiver prior to transmitting the training signal.

21. Apparatus according to claim 20, wherein the definition communicated by the transmitter comprises an identification of first and second edge frequencies defining bounds of the at least one segment and a level of the attenuation between the bounds.

22. Apparatus according to claim 20, wherein the definition communicated by the transmitter comprises an indication of power spectral density at each of a plurality of frequency points within the at least one segment.

23. Apparatus according to claim 16, wherein the level of attenuation is determined so as to enable reliable detection of the training signal by the receiver within the at least one segment of the spectral range.

24. Apparatus according to claim 23, wherein the level of attenuation is determined so that the training signal substantially conforms to the mask.

25. Apparatus according to claim 23, wherein the level of attenuation is determined so that the training signal has a higher amplitude within at least a portion of the at least one segment than is provided by the mask.

26. Apparatus according to claim 25, wherein the transmitter is adapted to increase the level of attenuation after sending the training signal, so that signals transmitted thereafter by the transmitter do not exceed the amplitude within the at least one segment that is provided by the mask.

27. Apparatus according to claim 16, wherein the receiver is adapted to correct a value of the received training signal based on the level of attenuation, and to use the corrected value in compensating for the response.

28. Apparatus according to claim 27, wherein the receiver is adapted to correct the value of the received signal by adjusting a level of the received signal at

each of a set of carrier tones based on the level of attenuation at each of the carrier tones.

29. Apparatus according to claim 27, wherein the definition comprises an indication of a power spectral density (PSD) function, and wherein to correct the value of the received training signal, the receiver divides the value by a square root of a ratio between a value of the PSD function at a given carrier tone and a nominal PSD level.

30. Apparatus according to claim 27, wherein the receiver comprises an adaptive digital filter, and is adapted to determine coefficients of the filter responsive to the corrected value.